PLEASE AMEND THE CLAIMS AS FOLLOW:

1. (Amended) A communications system, for controlling the transport of SONET channels comprising a contiguous plurality of SONET frames each having a predefined time duration, the system comprising:

a Common Time Reference (CTR), divided into a plurality of contiguous time frames (TFs), wherein the time frames have a plurality of predefined time durations;

wherein a SONET channel consists of a predefined number of lower-rate SONET sub-channels;

wherein the predefined number of lower-rate SONET sub-channels are byte interleaved within the SONET channel;

means for separating the SONET channel, within the fixed time duration, into a plurality of non-byte interleaved lower-rate SONET sub-channels;

wherein each of said plurality of non-byte interleaved lower-rate SONET sub-channels is defined as a part of the SONET frame;

first means for mapping each of the non-byte interleaved lower-rate SONET sub-channels to selected ones of the time frames; and

wherein the selected ones of the time frames with the non-byte interleaved lower-rate SONET sub-channels are switched and forwarded responsive to the CTR.

~~means for separating each of the SONET channels into at least one SONET sub-channel each comprising of a sequence of contiguous SONET frames;~~

~~wherein each SONET frame consists of at least one data unit;~~

~~first means for mapping each of the SONET frames to selected ones of the time frames; and~~

~~means for providing for data transport of the SONET frames responsive to the first means for mapping and the CTR.~~

2. (Canceled)

3. (Amended) The system as in Claim ~~2~~1, wherein each of the ~~parts~~ SONET channel and SONET sub-channel is at least one of the following: STS-1, STS-3, STS-12, STS-48, STS-192, and STS-768~~;~~.

4. (Canceled)

5. (Amended) The system as in Claim ~~4~~ 1, wherein the first means for ~~providing the data transport~~ mapping is a time-driven switching apparatus; the system further comprising:

a switching node with a plurality of input ports each having a unique address and a plurality of output ports each having a unique address;

a position logic for determining a relative position for each of said respective incoming parts of the SONET frame within the respective particular time frame; and

a forwarding and transmit delineation controller responsive to (1) the unique address of the input port associated with each one of the incoming parts of the SONET frames; (2) the associated time frame of arrival; and (3) the associated relative position for each said respective incoming parts of the SONET frame within said time frame of arrival, to provide a routing to an associated particular one of the output ports at an associated particular position and within an associated second particular time frame.

6. (Original) The system as in claim 5, wherein the forwarding and transmit delineation controller provides routing of each of the incoming parts of the SONET frames to a plurality of the output ports, each of the plurality of the incoming parts of the SONET frames having a respective unique associated particular position within an associated one of the predefined time frames.

7. (Original) The system as in claim 5, wherein each of the time frames has a defined duration from start to end, wherein each of the input ports is comprised of a serial receiver that provides position delimiters associated with each of the incoming parts of the SONET frames coupled thereto, wherein the position logic is a position counter, wherein said position counter counts the position delimiters that have occurred since the start of the respective one of the time frames.

8. (Original) The system as in claim 7, wherein the time frames are cyclically recurring, wherein a sequence of position delimiters within the cyclically recurring time frames is implicitly defined by a predefined sequence of time units of equal duration.

9. (Original) The system as in claim 7, wherein the time frames are cyclically recurring, wherein the sequence of position delimiters within the cyclically recurring time frames is defined by a predefined sequence of time intervals of arbitrarily different duration.

10. (Original) The system as in claim 7, wherein at least one of the start of the time frame and the end of the time frame is marked by a time frame delimiter.

11. (Original) The system as in claim 7, wherein the position logic is incremented at predefined time intervals relative to the start of the time frame.

12. (Original) The system as in claim 11, wherein each of the positions is of predefined time duration.

13. (Amended) The system as in Claim ~~4~~ 1, wherein the first means for ~~providing the data transport~~ mapping is a time-driven priority apparatus; said system further comprising:

a pipe comprising at least two switching nodes interconnected via at least one optical channel in a path; a Forwarding and Transmit Delineation Controller for assigning selected predefined time frames for transfer into and out from each of the respective switching nodes responsive to the common time reference;

wherein for each switching node within the pipe there is a first predefined time frame within which a respective one of the parts of the SONET frame is transferred into the respective switching node, and a second predefined time frame within which the respective part of the SONET frame is forwarded out of the respective switching node; and

wherein the time frame assignment provides consistent fixed intervals between the time between the input to and output from the pipe.

14. (Original) The system as in claim 13, wherein there are a plurality of the pipes, each of the pipes comprising at least two of the switching nodes interconnected via optical channels in a path.

15. (Original) The system as in claim 14, wherein the optical channel is a connection between two adjacent ones of the switching nodes; and wherein each of the optical channels can be used simultaneously by at least two of the pipes.

16. (Original) The system as in claim 14, wherein for each of the same predefined time frames, multiple SONET frames can be transferred utilizing at least two of the pipes.

17. (Amended) The system as in Claim ~~4~~ 1, ~~wherein the means for providing the data transport is a fractional lambda pipe apparatus;~~ said system further comprising:

a first communications switch and a second communications switch connected by at least one communications link, comprising at least one channel, for transmitting a plurality of data units from said communications link to the output of the switching system;

wherein predefined number of time frames (TFs) are grouped into a time cycle (TC);

wherein predefined number of time cycles (TCs) are grouped into a super cycle (CS);

wherein each of the communications switches is further comprised of a plurality of input ports and a plurality of output ports, each of the input ports connected to and receiving data units from the communications link from at least one of the channels, and each of the output ports connected and transmitting data units to the communications link over at least one of the channels;

wherein each of the communications links is connected between one of the output ports on the first communications switch and one of the input ports on the second communications switch;

wherein each of the communications switches has a switch controller, coupled to the CTR, the respective input ports, and the respective output ports;

wherein each of the communications switches has a switch fabric coupled to the respective switch controller, the respective input ports, and the respective output ports;

wherein each of the switch controllers is responsive to the CTR for scheduling connection to the switch fabric from a respective one of the input ports, on a respective one of the input channels during a respective one of the time frames;

wherein each of the switch controllers defines the coupling from each one of the respective input ports for data units received during any one of the time frames, on a respective one of the channels, for output during a predefined time frame to at least one selected one of the respective output ports on at least one selected respective one of the channels; and

wherein each SONET frame is comprised of at least one of a plurality of data units, wherein the data units that are output during a first predefined time frame on a selected respective one of the channels from the respective output port on the first communications switch are forwarded from the respective output port of the second communications switch during a second predefined time frame on a selected respective one of the channels responsive to the CTR.

18. (Original) The system as in claim 17,

wherein the plurality of input ports each receives data units over at least one of a plurality of incoming channels (j), and wherein the plurality of output ports each sends data units over at least one of a plurality of outgoing channels (l);

wherein each of the incoming channels (j) has a unique time reference (UTR-j) that is independent of the CTR; and

wherein the (UTR-j) is divided into super cycles, time cycles, and time frames of the same durations as the super cycles, time cycles, and time frames of the CTR.

19. (Original) The system as in claim 18, further comprising:

a plurality of buffer queues, wherein each of the respective buffer queues is associated, for each of the time frames, with a combination of one of the incoming channels and one of the outgoing channels; and

a mapping controller within the switch controller for logically mapping, for each of the (UTR-j) time frames, selected incoming channels (j) to selected buffer queues, and for logically mapping, for each of the CTR time frames, selected ones of the plurality of buffer queues to selected outgoing channels (l);

wherein each of the buffer queues is further comprised of an alignment subsystem comprised of a plurality of time frame queues, wherein each of the time frame queues comprises means to determine that the respective time frame queue is empty, wherein each of the time frame queues further comprises means to determine that the respective time frame queue is not empty;

wherein the data units that arrive via the incoming channel (j) are stored in the respective time frame queue of the alignment subsystem responsive to the mapping controller; and

wherein the mapping controller further provides for coupling of selected ones of the time frame queues to respective ones of the outgoing channels (l), for transfer of the respective stored data units during the respective associated CTR time frames.

20. (Original) The system as in claim 19,

wherein the alignment subsystem, responsive to the mapping controller, transfers all of the data units associated with a respective first time frame as defined by the UTR-j into an empty first time frame queue from incoming channel (j), during the respective first time frame as defined by UTR-j, wherein the respective time frame queue is designated as full;

wherein the alignment subsystem, responsive to the mapping controller, transfers data units out of a full second time frame queue to outgoing channel (l), during a selected one of the time frames (TFs) as defined by the CTR, wherein the second time frame queue is designated as empty; and

wherein the first time frame queue and the second time frame queue are mutually exclusive at all times.

21. (Amended) The switch as in claim 20, wherein the time frame queues are comprised of at least two~~, three, and more than three~~ time frame queues.

22. (Canceled)

23. (Original) The system as in Claim 17, wherein the switch fabric is at least one of: an optical cross-bar, an optical banyan network, a Lithium-Niobate optical switch, an Indium Phosphate optical switch, a 2-D MEMS optical switch, a 3-D MEMS optical switch, a semiconductor optical amplifier (SOA) based optical switch, an holographic optical switch, and Bubble optical switch.

Claims 24-36 are Canceled.

37. (Amended) A communications method, for controlling the transport of a plurality of SONET channels comprising a contiguous plurality of SONET frames each having a ~~predefined~~ fixed time duration~~, wherein each SONET frame consists of at least one data unit,~~ the method comprising:

providing a Common Time Reference (CTR);

dividing the CTR into a plurality of contiguous time frames (TFs), wherein the time frames have a plurality of predefined time durations;

separating each of the SONET channels into at least one non-byte interleaved lower-rate SONET,

wherein each said non-byte interleaved lower-rate SONET sub-channel is defined as part of the SONET frame~~; sub-channel each comprised of a sequence of contiguous SONET frames;~~

mapping each said part of the SONET frames to respective selected ones of the time frames; and

providing for data transport of each said part the SONET frames responsive to the mapping and the CTR.

38. (Canceled)

39. (Canceled)

40. (Amended) The method as in Claim ~~38~~37, further comprising:

selectively mapping ~~to a~~ respective ~~one~~ ones of the time frames to ~~at least one of the following: multiple ones of the SONET frames, and multiple~~ ones of the parts of the SONET frames.

41. (Amended) The method as in Claim 40, further comprising:

providing a switching node with a plurality of input ports each having a unique address and a plurality of output ports each having a unique address;

determining a relative position for each of said respective incoming parts of the SONET frame within the respective particular time frame; and

providing a routing to an associated particular one of the output ports at an associated particular position and within an associated second particular time frame responsive to the unique address of the input port associated with each one of the incoming parts of the SONET ~~frames~~frame; and the associated relative position for each of said respective incoming parts of the SONET frame within said time frame of arrival.

42. (Original) The method as in claim 41, further comprising:

routing of each of the incoming parts of the SONET frames to a plurality of the output ports, each of the plurality of the incoming parts of the SONET frames having a respective unique associated particular position within an associated one of the predefined time frames.

43. (Original) The method as in Claim 41, further comprising:

providing a pipe comprising at least two of the switching nodes interconnected via at least one optical channel in a path;

assigning selected predefined time frames for transfer into and out from each of the respective switching nodes responsive to the common time reference;

transferring respective parts of the SONET frame into the respective switching node for each switching node within the pipe during a first predefined time frame;

forwarding the respective parts of the SONET frame out of the respective switching node during a second predefined time frame; and

providing consistent fixed intervals between the time between the input to and output from the pipe responsive to the time frame assignment.

44. (Original) The method as in claim 43, further comprising:

providing a plurality of the pipes, each of the pipes comprising at least two of the switching nodes interconnected via optical channels in a path.

45. (Original) The method as in claim 44, further comprising:

connecting the optical channel between two adjacent ones of the switching nodes; and

utilizing at least one of the communications links simultaneously for at least two of the pipes.